

mosquito **biology...**

The foundation of a quality mosquito control program is to have an understanding of the biology and disease-vector potential of the local mosquito species.



Psorophora ciliata

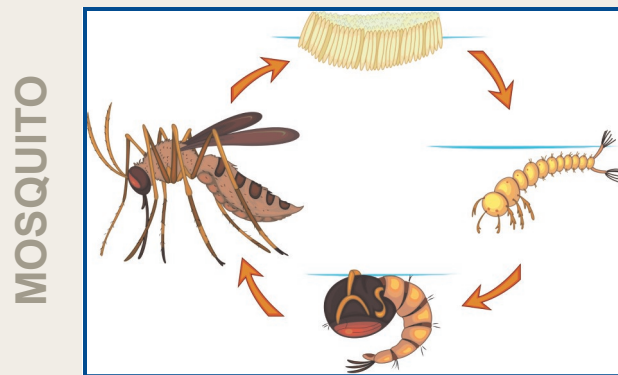
Mosquito Biology & Disease

Surveillance for immature and adult mosquitoes and the diseases they may transmit are part of the Biology Department's daily operations. Larvae are sampled in woodlots, fields, ditches, pools, sewage lagoons, and retention ponds while adults are collected from mechanical traps. These traps include New Jersey Light Traps, CDC Traps, and Gravid Traps. Data are collected and analyzed in order to control mosquitoes in the most effective way and reduce disease transmission while minimizing environmental impacts. Along with light traps, a series of rain gauges will be monitored to determine where larval production is occurring and to decide where to dispatch crews.

Monitoring of mosquito-transmitted diseases will continue for 2015 through processing/testing of adult mosquitoes and dead birds for the presence of West Nile, St. Louis, and Eastern Equine encephalitis viruses. *Culex* species are important for the amplification and transmission of WNV and SLE virus in our area and *Coquillettidia perturbans*, the cattail marsh mosquito, is an important vector of EEE.

Larval sampling/surveillance is important in determining the abundance of mosquito larvae in various habitats. The information can be used to determine optimal times for using larval control materials and to determine the need and timing for adult mosquito control. Crews collect larval samples daily that are identified by lab staff. Larvae are identified to the species level by using a dichotomous key and dissecting scope, which guides the user to make choices between various traits or characteristics such as number of head hairs, presence of a siphon, etc.

LIFE CYCLE



810 Livingston Avenue
Bay City, MI 48708
Contact us at 989-894-4555

Bay County Mosquito Control

Education & Outreach

Mosquito control programs need the support of an informed public, so community outreach will continue to be an important part of the 2015 program. Educational presentations are designed to raise awareness of mosquito habitats and life cycles. Each season homeowners are reminded of ways to reduce backyard larval breeding. Presentations are given to community service groups and township/county officials, while flyers, brochures, door hangers, book-marks, and rack cards are hand-distributed or mailed to county residents. Media will be utilized for press releases on important activities, events, and disease updates. K-5 educational programs will continue as well. Other topics will include mosquito-borne diseases, control material safety, and mosquito habitats.

2015 highlights>>>

Spring aerial application—3 lb/acre
Increase aerial acreage
3 airplanes consistently treating
TrapTech® Mosquito Lure
Purchasing electric ULV machine
Scrap Tire Drive
Seasonal wage increase

Bay County Mosquito Control

program **plan**

Aircraft Calibration

With aerial applications, Bay County can reach woodlots that are otherwise very difficult or too large to treat. Having the ability to utilize aircraft is an effective complement to ground-based activities. To calibrate, aircraft fly over a row of 15 heavy-duty plastic tubs, dropping *Bti* granules. The granules are gathered and weighed to determine the application dosage rate. Aircraft calibration also allows a swath width determination.



For more information go to
www.baycounty-mi.gov/MosquitoControl

Spring Campaign

Control mosquitoes early to make a big impact

Spring larviciding controls *Aedes* mosquito larvae in woodlots using *Bacillus thuringiensis israelensis* (*Bti*) to prevent them from emerging as biting adults. *Bti* kills 1st-3rd instar larvae, but does not adversely affect other wildlife or beneficial insects, people or pets.

Aerial and ground applications will be timed to best impact larvae. BCMC has contracted with Earl's Spray Service of Breckenridge, MI to provide aerial application via fixed-wing aircraft.

Woodland acreage treated by air will increase by several thousand acres with 45,000 acres scheduled for treatment. The dosage rate will remain at 3 pounds of *Bti* per acre.

Treatment will occur after extensive surveillance has taken place and larvae are at the appropriate developmental stage.

The following is a list of aerial program components: 40 woodlots monitored, 300 acres of woodlots treated by ground crews, 3 aircraft, 1 loading zone at Barstow Airport in Midland, aircraft calibration, 45,000 acres treated by air, and quality control to monitor aerial application.

Woodlots are monitored both before and after application to determine treatment efficacy through pre- and post-larval counts. The dip counts are taken in both treated and untreated (control) woodlots.

2015

Summer Larviciding

Larviciding involves the introduction of control materials into aquatic habitats to control larvae or pupae and prevent adult emergence.



Emphasis will be given to source reduction in the form of dumping water from containers to eliminate larvae. Technicians will respond to residential service requests as

Habitats with a previous history of breeding will be investigated, with additional emphasis on mapping new sites. We expect to survey nearly 20,000 sites, treating about 15% of them.

well as survey known breeding sites or new sites found during daily monitoring. Larviciding is a main program component, comprising about 70% of daytime efforts.

Control materials utilized include the microbial products *Bti*, *Bacillus sphaericus*, and Natular (spinosad), as well as temephos and larvicide oils. Habitats monitored include catch basins, roadside ditches, abandoned pools, flooded fields and woodlots, retention ponds, scrap tires, and containers.



Adult Mosquito Control

Protecting public health by managing mosquito populations is BCMC's primary goal. Through control, the number of adult mosquitoes is lessened, thereby reducing their annoyance and disease risk.

In order to meet that goal, eight ultra low volume (ULV) truck-mounted spray units will be used with treatment occurring from sunset to 2:00a.m., provided mosquito populations warrant treatment and that weather conditions are conducive. The ULV



machines dispense a small amount of control material that must come in contact with adult mosquitoes in order to effectively control them. Machines are calibrated to ensure the proper dosage is applied according to label recommendations. Droplet size is also measured and adjusted on a regular basis ensuring the spray is as effective as possible.

BCMC will continue to focus efforts where there is potential disease risk, as well as respond to areas where high mosquito numbers, as indicated by traps, are affecting Bay County residents. Public park and recreation areas utilized for public functions will also be serviced. An electric ULV machine will also be utilized full-time during the 2015 season.

Personnel

Seven full-time and 27 seasonal employees will be employed for the 2015 season. Seasonal employees fill the following positions: 1 data entry clerk, 2 biology assistants, 16 larval control technicians, and 8 adult control technicians.

Shift times are 8:00am—4:30pm (days) and 8:00pm—2:00am (nights), but may vary slightly throughout the year.

Service Requests & Special Programs

Service Requests—Bay County citizens call when adult mosquito populations rise to an annoyance level, when rain creates standing water on properties, or when planning outdoor activities such as picnics, weddings, and graduations. These calls are logged into a database and used as a means to monitor mosquito annoyance. Crews are dispatched to help in each situation.

Medical Needs Program—This program offers extra service to residents who have a verifiable, doctor-supported medical need that warrants additional mosquito surveillance/control. Often, these are residents who suffer from severe mosquito allergies.

No-Spray Program—Some residents prefer their property not be treated for mosquitoes. Yellow reflective signs mark property lines as a visual reminder to “skip” the property. Frequently, residents who opt out of adult mosquito control are still in favor of larval control.

Long Driveway Program—Homes that sit a distance off the main road that do not receive adequate adult mosquito control may opt into the long driveway program. Drives are mapped and sprayed during regular township sweeps. The supervisor will verify the drives qualify for length, ease of treatment, and mosquito harborage.

Training

Technicians are required to attend a day-long training session that takes place in May where all aspects of the program are discussed. Hands-on training takes place on the job with a certified trainer. Seasonal employees must pass two written tests administered by the MI Department of Agriculture & Rural Development (MDARD) to receive a certified pesticide applicator card. Certification lasts for 3 years.

Q: What is Source Reduction?

A: A Method to Eliminate Mosquitoes

Source reduction is one component of an Integrated Mosquito Management (IMM) program and may be referred to as sanitary control. It refers to dumping water from, removing, or covering man-made larval habitats. These water-holding containers include tires, tarps, bird baths, boats, etc. and provide developmental habitat for many mosquito species including *Aedes triseriatus*, *Aedes japonicus*, *Culex restuans*, and *Culex pipiens*. Eliminating container habitats is an effective strategy for preventing mosquito-borne illness as many container species are disease vectors.

Product & Equipment Testing

Evaluating current and new control materials/equipment is essential in providing cost-effective service and continuously improving operations. In 2015, we will be evaluating the TrapTech® Mosquito Lure attached to CDC Light Traps to evaluate its effectiveness in trapping woodland *Aedes* species, especially *Aedes japonicus*.